Notebook, N-05-03-02.2

This notebook covers the period March-June 1905. Most of the book contains notes, primarily by Edison, regarding storage batteries. Most of the entries pertain to electrochemical preparation of nickel flake and to electroplating cell components such as grids and pockets. In addition, there are notes relating to the loss of cell capacity associated with the swelling of the nickel pockets. There are also tests of cells using cobalt preparations, along with assays of nickel and cobalt ores. Several of the entries were witnessed by Frank L. Dyer. One page of notes has been inserted into the book. The pages are unnumbered. Approximately 200 pages have been used.

March 2nd 1905 — GZD

Experiments on making porous metallic Cathodes for Battery grids by Reducing Ni + Ni + then acting on nickel by KOH + NaCl to form peroxide of the porous also to fill pores by soaking in Ni Salt + action KOH + washing several times until pores filled —

Cake of Dehydrated Ammonia Chloride Ni — 250 atmos pressure — at quite high heat perfectly worked together + porous 4 grams Coke Calliper 108/1000 shrunk to 137/1000 by high heat + 65/1000 low red heat at low heat the Ni is perfectly reduced

Mch 2 1905

+ microscopically globulated
+ it not sufficiently coherent
for practical use but the
highest one is OK - its
a little curled but this -
is due to bad conditions in
small glass tube Think
they can be brought out
True = The 65/1000 could
be used in a cup -
The 37/1000 squeezed 250 atmos
Cell pressure 17/1000 - porosity 5 to 1
(1.6) porosity 81/4 - width 3/8 inches 1/2
so the porosity is less - Total shrinkage 3.6 times

Make following Cakes -
Mg Ammonium Chl -
1 6 grammes Mg Amch - all 250 atmos ✓
2 ~~3~~ 4 " 1 gram Magnesia Ox - ✓ 1-1
3 ~~5~~ 4 " 1 " Phosphate Lime - Ca ✓ 3-1
4 4 " 1½ grams Chloride Ammonium fine 2-1
5 4 " 1½ gram Magnesia Oxide ✓ 1-1
6 4 2 grams Magnesia Oxide 4-1½
7 4 1 gram Chalk ✓ 2-1
8 4 2 grams Chalk - 2-2

LLD

March 2nd 1903

9 = 4 grammes Ni Salt. 1 gram Zinc Oxide 4-1.
10 4 " 2 gms " 2-1
11 4 " 1 Carbonate Barium 3-1
12 4 " 1½ " 2-1
13 4 " 2 " 1½-1
14 4 of the Nickel Salt alone
15 4 gms Ni Salt, 1 gram Chromium Oxide
16 4 " " 1 " Manganese peroxide
17 4 " 1½ Bismuth Carbonate, 1
18 4 " 1½ Carbonate Zinc
19 4 " 1-1 1 gm Magnesia, wet with acetate Nickel
20 4 " 1½ "
21 4 1½ 1½ Lampblack

22 5 grammes paste Ni Hydroxides squeezed in press
mixed with 2 grammes Magnesia Oxide
mixed well on Mortar, & such a pressure that it
will not squeeze out in gauge, when you
make it squeezing over slop 250 ut
not filled

23 4 grammes dehydrated green
Chloride of Nickel. see Ethan about
dehydrating
220

24 4 grams anhy Ni Chloride
Magnesia Oxide

25 4 gms anhy Ni Chloride
1½ grams Magnesia Oxide

FRANK LOVER

No 1 alloy — is
flake nickel from filings
Reduced in Hydrogen — it
stuck together somewhat
but could powder it by
fingers — its Companion
which not Red Hydrogen
only gms 357 to Vol H
it takes stuck together
as much wanted but
Cover Even with
3 grms to 8 —

Alloy No 2
gwh fused with flake Cu H,
& then sulphurized —
Runs pretty fine

FLD

FRANK L. DYER
MAR 1 1926
PLAINFIELD N.J.

Mch 8 1905

good way to make Ni Co Sealer

polished sheets put in closed
space, pass H, while hot,
then H_2S, this makes a film
of Sulphide colored, comes
off 2 day — these are then
put — like heated to
oxidize then Reduced by H —
great recovery power —

We are now separating in
Ni + Co + other alloys
to get the Sulphide flakes
in higher — not so brittle

Tried Oth making the beat'd steps
for gas to be acted on by Selenium Tel
Hydrogen Se_2H, SbH AsH
possible SiH, Very thin to be put
in small lumbers the
KOH, high density C
see of the Surface all
Bi Sulfide dont seem
work its apparently all

March 8 1905 8 P.M.

by the Odd r Drain —

We are coating Ni + Co flakes by Rolling process with thin skin of the Metalloid Hydrogen Compounds which that just enough S in sulphur to form a sulphide without dissolving flake. Solid of the flake + the Ni_2S or NiS or whatever sulphide is formed shows no action after 24 hours in KOH + the very Current density

The 60% Cobalt 40 Ni alloy shows nothing except a slight brown tinge — CN Silver Gold all flake Solution pink or violet 40 Ni 60 Cobalt no action except brown tint,

gwa gong make some flake Silicon by using aluminum fusion process

(11)

March 8 1905

think we can get it thin
enough to use with Ni OH/2
its first alloyed by acids
or alkali. —
As it can be rolled prosecy
it could be used as a
grid for lead batteries
& closed cups to prevent
lead or coming out —

Dunn is making flake
Zirconium — yesterday well up
up to 60 of flake w. of
Zirconium T.S. Pieron —

Make some Limestone 30 mesh or 50
use thick or not thick nickel
flake so it will cover all
right. Use out about 2½ grams
Metallic Ni + 50 % press,
then Sork, then SP 100 Cor 200
& put in hydrogen & fuse.
Ni flake Coefficient - dissolves
out lime & the Oxid with KOH + HACl

March 8 1905
Up as far as safe to go —

Alloy No 3 - Edison
60 Ni 40 Co Rolled
in Rods

Alloy No 4
60 Cobalt
40 nickel —
Entirely to thick
don't Cool - 20 sm
3 1/2 q to 8 qrsm

(1A)

March 10 1905

No 5 Ξ Chrom, Molybdenum Fe
Metal powder

No 6. Ξ. Tungsten Metal powder
Fe

No 7 Ξ Titanium Metal powder
Fe

No 8 Ξ - Oxide Cerium - Ni

No 9 Ξ Iron 80% Boron 20%
powder - Metal - Fe

No 10 Ξ Metal Manganese powder
Ni

No 11 = Crystallized Silicon
made by Dunn -
Big Cornwall power 842 plenty

Mch 10 1905

E No 12 – Cobalt f Cake
Plated about .0002 by
Dally + Chaney in Hydrof
by Febroquest – dont
look very bright –
its in shivers, its lucky
but covering power not
good, am going to screen
some thru 20 –

E No 13 – Thru is No 12
Screened thru 20 mesh

E No 14 = Silver foil in book
Covers fine –

$20

DEC 20 1948
DIVER
PRINCETON, N.J.

Mch 10 1905 — 820

Copied from small note book Mch 5 1905 —

To make reg non moreweakle at fading Hupwich milkcream Enough to soak it then dry — powder — screen to night to go put in pocket soak out ~~any~~ milkcream

Make alloy Ni + Co to make flake by rolls + oil process from 90 Ni to 10 Co & from 90 Co to 10 Ni make test cells —

Clean Ni flake by rolls & oil process with hot Hydrogen also Co —

Try flake Ni plated with an alg Pt —

Try anly N_2O_3 with flake Ni bat 1st half OK try with flake Ni

(J.D.)

Mch 10 1905 220

Copied Continued Mch 5. 1905 –

Its advantageous to size product of $Ni(OH)_2$ production thro 15 on 30 but as this is not very Concl Can make it 15 on 100 mesh making as much coarse as possible So the Regular less Ni Cases of Cake to Coal surface. That if it was finer That growing 100 mesh is ground finer & put back into the mixing $Ni(OH)_2$ in process of purifying & used again

Heat Uranate Na & K & see if Carbonate also in what Hydr

Ni flake Coated with Ni_2O_3 anhy & used – also Ni_2Co alloy 1/2 & 1/2 Coated Co_2O_3 then made anhy

23

March 10 1905

Copied & enlarged March 5 1905

Looked very thin & broken on film
from old No 26 Eccl by
Ultramontane Light.

Get some Mi Cups which have
run long time & are yellow tinted
& find about what will
clean it or make solution
where it can be cleaned
Electrolytically

Get a couple 33% good
Cap packets, dry one with
Koth in & Recor 75 | the other
soak 10 mins H_2O & the Cor
put back in 33% note swell
leaves it off Cor

Try a sulphurous a polished
Mi strip at electrolyze in
Koth.

212

Mch 10 1905 — 820

Copied Gold - Mch 15 1905

Put in following alloys

~~Ag~~ 70 Co 30 | Ni — 80 Co 20 | Ni

Cu plated Ag

Cu " Pt

Sulphurized Ag | Ni Co Fe Pb

Bi Mg | Cu | Cd Mo Mn Cr

Selenide Ag Cant be deposited of all its Se by washing Even from in alkali

Try Strip Ag Sulphized also Selenized

Graphitoidal Silicon

Silicides —

Graphitoidal Silicon not attacked by acids

Not Acid Chlorate K Bichr or alkali

March 10 1905

Copied Card March 5 1905

See Rutile Titanite, Chromite
a Carder also Molybdenite

Silicon alloys ni Co - Etc

Niobium Nitride Conducts Elec
dull black powder not
affected by nitric sensitive by
aqua Regia -

To make nitrides Electrolytic
use metal as positive & plot by
in Ammon Chloride

March 19 1905

Molybdate Phosphide
Conducts Elec

Tungsten Nitride
not decomposed by acid
or alkalis

PATENT DIV.

March 10 1905

Copied Cont March 9th - JRD

Write Benjamin about Vermont for cans also the Standard Oil Stuff for trays

Plate Ni on Iron both sides then roll out to flakes Eat non out weld by heat also plate Ni Co 60% Co 40 Ni on non then dissolve in H, roll out flakes Eat non out.

Trypocket with Aluminum Gold also with Hg 72 Side —

If electrouble with Antacids ~~with~~ metallic Ni in H — forming a hydride then the Aluminum Co. If nitrogen then use Mg + Silicon in atmos free of N The plated Ni Co. Semi-alloy heat in Co to weld w/

Mch 10 1905 —

Copied Mch 9 1905 —
in Vacuo previously displayed
air by Co —

Take 2 mrs 33% Chgd dry
with Roff, then ReCot 200
then soak water, put 1 in
33% then other in 21
see swell —

Plot swell of grown from 20
to thru 200 see which
greatest swell also
Compare swell Beg —
Reg Com 33%

Mch 10th —

Make a Co by H. powder
15% Hg run as 7/2
get chg + display vacuums
output etc

Hg

DYER
MAR 16 1905

March 10th 1905

Curious – Why dont strong acetic a clean the black MnO_2 & PbO_2 & I_2 rate out of Cryst. Iod. No effect of PbO_2

See if Mal. acid will remove $CaCO_3$ from MnO_2 – soak 48 hours.

March 11 1905

Make pockets already Cut ft with one Edge open with flap. Put in ft in wooded Cogitation then fill at Ends close flap. Put in grid + Relax Light pressure groove Edges Cup also Grooves filling.

Could fill Cellulose by assembling in frames in form Cellulose felt say 1/8

March 11 1905

Then tumping or so on

Make a Reg 2.8 with .6
of 3/100 gr as fibre mixed
to make perfectly

When get plenty flake
make group 20 or 30
then drift in when cups
150 Mesh No 0 & 2 into
interstice then grass
dutto 20 or 30 full cup
pour matter paraffin
press & drain the paraffin
out
or what will be better
perhaps put cups together
hand pick then dip full
with paraffine by dipping
hot & cooling then
decolorize out the leaves
parasite perhaps something
harmless then paraffin
better pour also out
sugar influences

DYER
MAR 27 1905

Mch 11 1905

Make some Ni flake burn to oxide, then reduce in H. To get rid Nitrogen.
Also Reduce in CO. to get rid HCN

Try German Silver flake —

Alloy of Ni & Al
Al 6 Ni large Tin white
Lamellae SG 3.67 by
Melting 8 pts Al / with
3 pts sublimed NiCl
20 pts Cl & Na treating
Regulus with dilute HCl

Ni_2Sb_2 thin plates
Thin flake would work
in Na possibly

220

THOMAS LOVER EDISON

Mch 12 1905

allow Ni 50 Cu 50 plate out Cu
see if falls ppts —
also precip by KOH from
Chloride - the Ni & Cu as
hydrates Rid by H,
& then plate out Cu
the Ni being left as oxide —
to be acted on by current
in NaCl + KOH Sol —

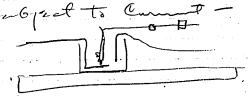
Mch 14 1905

Treat Reg E. 18 Ni gr. when free
from KOH with Bromine
Water after removal to
make all the iron is reduced
to metal. - The Br will
remove the iron + clean
Ni possibly there is
some Co & Manganese
Get gr. 2 + pkt —

220

Mch 14 1905 — EKD

Make machine to test Contacts immersed in KOH + subject to current —



Swelling may be largely due to crushed + compressed surface at contact but mix + pkt + very closed holes so friction of gas spot at he Cas very great

try flake Co 60% Ni 40%

Ni gives in Carp with very open holes — Can file burrs free of wall diminished in also thin + fine

CO Ni Reduced by H. + black outside flake outside — so when compressed these pitch flap flake from touching leave air passage?

March 14 1905

Group 700 mlq Chl Na mixed
with Reg mix — Cor 200 —
Soak —

ditto Cor 200 soak recor 200

ditto dest 50 ok —

Put a grid in Camps
4 cly 4 blue 33 only below
10/10000 swell content 2/1000
Edges — Then remove
Clumps —

EZD

March 15 1905 —

No 15 E — a bulk of K Sulfate
Equal to 8 grams green $NiOH_2$
30 on 80 mesh 1.250 Mal acres
2.5 0001 flake ni & Al. C.
red by H — well covered &
great excess very bulky —
Its to be soaked out, washed in
H & Edison to soak in ~~Hydro~~
Ammonia Solution from Ni_2O_3
hydrate — porro to be filled
as far as possible by dipping
+ drying many times —

Edison No 16 — Dup of
15 but with 0003 Nickel
flake — & 1 gram Mal acres
Same bulk KSO4

F.E.D.

Edison 17 · Mg wet with Dilution
CuOK — worked & mortar —
pressed Cake 200 almos
heat cherry red — powder
30 on 80 — 3.700 Mg
500 mlg Mal ac — 1 gram
0001 flake ni —

[43]

Mch 15 1905 –

to 6 oz cooked free KOH, dried & given to Qwd to run to Qwrdening heat in Hydrogen. then given to Edison to dissolve out MgO by dilute HCl, then fill with $Ni(OH)_2$ by solution process –

FLD

Makes some MgOx 20 grms
15 cc of a 4% solution of
K_2CO_3 – Hand c. grind
3 gram Cakes to 6 hours bright yellow & .30 on 80 –

on pressing at 250 at 6 gr/cm² out to thermally tro cost,
I now add 10 grms fresh MgO + mix –
4 gram Cake –
This makes 30 grms MgO 15 cc
4% K_2CO_3 Solution –
Even this is too much liquid but its near – Cake is fine –
I now put in 8 grms more MgO – making with what lost & made in Cakes approx
40 grms Mg to 15 cc

March 15 1905

40 grms MgO & 15 cc of a 4% solution of K_2CO_3 weak mixed seems to be ok for making Cakes, now we will dry Cakes & bring them up to yellowish white & crush to see if ok =

after heating to dull white - shrinkage is land think 50% =

its more friable than it should be wants to be little stronger but can use what we have, ok I think -

FLD

COVER

Mph 15 1907

Using Sulphate of Potash of a bulk equal to 8 grams of $Ni(OH)_2$ thro 20 on 30 weighs ~~10.560 grams~~

When served thro 30 on 80.

for group a_5 requires, 21 grams

Equal to 16 grams Ni OH 20 on 30

8+2 would be 4 grammes of flake —

2 grms Malmesa

FLD

March 16 1905

The Cups made up with Mg flake & Sulphate of Cobalt shrunk too much welded to bottom side of Cup — possibly acid the K_2SO_4 not got out as we didnt test for Sulphuric — & possibly Heat too high — The flake welded to pickers OK —

A Cup which only had flake in welded OK & didnt shrink this would be OK but its almost uneconomical to put it in Cups which we must have something to back up the flake —

I am now going to try Sulphate Magnesium with flake —

F.L.D.

April 19th after 750 hours
1 amp density
on 2" surface

18 – Browned
19 Red some rubs off
20 only four patches
21 Red Good
22 "
23 "
23 Red brown [illegible]
24 Brown [illegible] rubs off
25 – Brown Strong
26 Red [illegible]
27 "
27 just a blush of brown
26 Browned

old Thermo alloys March 21 1907

Alloy 18 ingot put in 21/2 2 1/2 amps
in muffle – March 20th –
Ni 10 Iron 10 – browned slightly May 15
820

Alloy 19 Ni 15 Manganese 5
Browned slightly May 15

Alloy 20 Ni 15 Bismuth 5

" 21 Ni 15 Antimony 5 } Both pickled Brown May 15 May 15 9 a.m.
" 22 Ni 15 Tin 5 }

" 23 Ni 10 Copper 10 } bright

24 Iron 15 Ni 5 } Pickled May 15

25 – Bismuth 15 Ni 5 Brown

26 " Antimony 15 Ni 5

27 Copper 15 Ni 5 Browned slightly May 15

28 Cobalt 10 Fe 10 – May 15 Bright

(29) 29 Cobalt 5 Fe 15 – May 15 browned slightly

March 22 1905

Assay 26 - grms of 66 lots. grms
after Current off - Powder
finely divided No 4 Sieve
Bright absorb Enough Oxygen
to oxidize as a preliminary step gr.
could find that proportion -

Note

Weight of wanted Triarylamine
Equivalent in bulk to 8 grms of
Nitrophen Mno 20 on 30 - The
Phos Mno 30 on 60 -

5.820 - showing it lighter
than Nitrophen,

· Call it 6 grammes as the
Equivalent -
use 1 grm Material -

F.C.D.

March 22 1905 FCD

No 9080 - of test book

No 7 vs Edison No 30

pocket filled with Cobalt flake not quite enough to fill - then wound with Ni wire - & dipped 5 or 6 times in NiOH dis in Nitty & Carb Nitty - & dried each time finally soaked ~~2 or~~ 2 or 3 hours 21% KOH. then washed & dried - A lot of stuff outside on wires which will probably fall off - weight original 4.467 -

now 6.771 -

Think that not having flake enough the first dip composed the whole thing inside

(47)

Mch 23 1905

Edison No 31

first cups pressed with
metallic flanges one end
open — filled with Splint
Carbon — Cake by pressing
0002 — Packages 7" long heavy
to be given W.A.
to weld in Hydrogen & then
to be dipped by Edison
proper number hours in
Wax & m. of M. Otto in Nitry
No 9081 two Splint Co flake
No 9082 " Short Curled Co flake
650 only just fills - tamped fairly strong -
No 9083 — ditto
9084 " } all but 1st one flake
9085 " } received thro 20 mch

Edison 32 –

9086 – same as 9085 but the Cobalt flake screened thru 40 mesh – weighs about 675 of this size –

Edison 33 –

9087 This is thru 40 mesh flake put in by jarring no tamping about 620 went in – could have jarred more again the 650 in 9 guess.

Edison 34 =

White hot heated Cake MgO – thru 20 on 40 –

6 grms Equivalent in bulk
1.75 Flake Co 0002 – thru 20
750 mlg Magnesia
Dont cover wake Heal –
dont seem to stick
Enough – previously wet
a drop MgO –

The ammonia sol after 102 dups. - treated KOH, washed + dried weighed.

9081 gram. 1.380
9084 " 1.130
9082 1.279 -

After 142 dups put them in 33% KOH all night high up on board 1½" over plate, running washed well dried.

Weights 9085 12.310
11.268
1.042

9084 12.760
11.399
1.361

9082 12.920
11.342
1.578

9086 13.870
11.850
2.020

9083 13.455
11.351
2.104 use as my best

9081 13.300
11.677
1.623

No 1
March 24 1905
Grids from March 23 1905
Weight Grid # 9081 = 11.677

Weight of Grid #9082 11.342

Weight of Grid #9083 cut per 11.351

" " " #9084 11.399

" " " #9085 11.268

~~after gram 93% wtg = 142 gram dup.~~
~~dups~~ 50

" " " #9086 11.8505

March 23 1904

Notice considerable green deposit burned off & cut not as good — probably burnt out unless stop there — also not as fast at first when I had drops too near hot plate surface — seemed to oxidize probably turn thin hydroxide —

The flake (Tube 40 has very much more capillarity. Shared was nothing less than 40. Think this is about right size —

Also test 5 deposited 62 drops very slow & green well spot form on Pantoxide cup to break out Solution Sulph. quickly — after sponge the soap NaOH, wonder its capillarity is so great it wets out Pantoxide —

March 23 1905 —

Have just tried Conc Nitrate Ni in ammonia — on evaporating that ammonia $Ni(OH)_2$ precipitated down — leaving Nitrate ammonia solution — which evap to dry. Then leaving in water the Nitrate ammonia dissolves out & fresh dose can be put in sponges.

Jwa reports that he can get more $Ni(OH)_2$ in the ammonia by using pressure. Comelly we need a 3 to 5% Sol instead of $1\frac{1}{2}$% to reduce the Labor of dipping —

I have except going of $1\frac{1}{2}$% Sol of $NiOOH$ in $NaOH$ + with quicklime to a Bath the water & chiss Concentrate the Solution,

It does it ok - but the lime dissolved in Good - best would be Barium hydrate but HiSay to take it out

(?)

Mch 24 1905

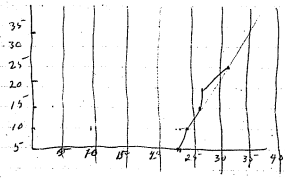
By putting sponge gride in Vac T
then running in mixture $NiO + H_2$
The patteries got in this way a
large quantity $NiO + H_2$ got in
two days drying after each
one — only damaged in that in
drying the contraction may
fill welded flakes apart,

New process crossed Iron as
Sulphate fe in fused in fused $NaOH$,
then washed dried, reduced in H_2,
with Buffer capacity $CP\ H_2$ prepared

Also Sulfate fe nitrated, then
fused $NaOH$,

Also Sulfate fe roasted carefully

Sulphate dissolved with $HgCl_2$ —
& Roasted — then washed



March 25 1905

Determined the Viscosity of KOH NaOH, dif %

KOH

33%	32 min	48 sec to run out
21	26 "	51 " "
15	26	8
10	23	55
5	23	30

NaOH

33%	129 min	3 seconds
21	72	37
15	41	6
10	30	38
5	26	18

10% KOH 5% Lithia

15	43	—

from this curve appear that 10% curve gives least swell but prob 21 is Best

These are grids of No 2 Edison

~~No~~

March 28 1905
12 Pockets filled with lebult flake screened through 40 mesh then treated with hydrogen 750 mil grams to a cobal

# 9106 =	11.779 –	Wt. before diffing
		Wt. after diffing
9107 =	11.851	
9108 =	11.089 — gum	
9109 =	11.849	
9110 =	11.674	after 2 days gum NaOH 1.044 leaching which
9111 =	11.570 –	2 days after water soaking gummed – 1.055 mil g 4 days 2 days more 1.074
9112 =	11.377 gum 908 —	
9113 =	11.956 " 954	
9114 =	11.802 " 888	
9115 =	11.378 989	

over

#91.16 11.909-1.021 ~~slit before clipping~~

9117 11.782 997- grid of No 2

average 959 Edem

(91)

Mch 29: 1909 —

So far have 62 dips on the 5 packets with Cobalt sponge welded.

I start 5 on dipping in Conc $NiCl_2 \times H_2O$, 1st dip dried in Vacuum Dryer - Considerable oozed out on 2 of them at ends. The holes of all mostly closed. think 2nd dip will not be good as residue ~~skin~~ may not be permeable or all ingress closed inside - Nearly have to use only one dip for chloride before doing KOH with Sulfate Ni. It will be diff. it dont have viscosity to close up everything.

possibly Chloride could be worked cold in Vac Dryer but I doubt it —

1st series 2 dips done
2nd 2 dips done
3rd series 2 dips Dipped 1115 =
Dipped 1 pm —
KOH 230, in water 345
Changed water 545 —
out water 650 pm —
at 7 o'clock put away for night
in morning put on asbestos, then
paper above is 6 dips of 2 each
after KOH + dried dry
9110 gained 1.384. —
9111 " 1.506
They appear slightly crystal but not certain.
Caliper 92 — 92.95
96 92.97
ones not treated 4th 59 — 91.90
Dipped 910 am — only 1 dip this series —
off + in KOH 1215 pm — in water 1240
only 20 minutes in 33% KOH.
after washing + drying No 9107 increased
from 11.851 orig 13.790 a total
gain of 1.939. Best appearance
Washed — after washing thoroughly
9111 — orig 11.570 — now 13.080 gain total 1.510
or .304 in last dip.

No 1 Chloride Cons
dipped slowly — dried 1½ hrs in
Vac dryer, then left in all night
hot, then dipped + air dried
about hour, then put in 33%
for 1½ hours, only trace of gained
out, Took out KOH, 1230 PM — Wed 29
put in water on holder
Notice that there is a lot of
Copper in solution, and this
will poly Knock the test out
am going to start No 3 set
with $NiCl_2$ free of Copper —
No 1 + 2 will be bad from Copper
but will show as to best
method of dipping —
Changed water — gain — at 510 pm
No 9111 — gained in the two dips
655 milligms after 2 dips KOH + soaking
in water 3 times as above
Put away for the night 715 —
Put it on dryer for hour Commenced
30th on Dryer 8.30 am, redipped 9 am —
on dryer 905 am — dipped at 11.50 am
put on dryer — KOH at 215 pm —
in water 3.45 pm — chg'd H2O at 610, changed
water Wed morning at 815 — Dryer 930 —

9111 has 1.885
9110 1.646
9106 1.957

No 1 Continued, make 1 dip more
dates on 3 of them then on other
3, put after 4th dip put in KOH
not, wash or dip once more
KOH + hot KOH, wash dip & look,
in KOH 635 pm [illegible]
[illegible]
dipped all - then KOH, water + dried
3 taken out for test.
The other 3 dipped + put in KOH
at 120 pm - dried -
dipped at 5 25 pm (this is
the 11th dip)
left in NaCl until 5.40 pm healed
545 -
Not dry yet put away -
dry in morning
Dried, put in hot 33%. Put at
230 pm in cold
Drying at 545 - [illegible]
Dry + weighed
No 9109 - gain 2.011
9107 2.219
9108 2.221

Dipped 810 - out 840. + on Dryer
leave all night up higher put on low -
morning

April 3rd 1905

No 1 in water 145 - last -
Thinking - as 1st 3 swelled & short
circuited + swell has caused flake to
separate from cup sides - am going
to plate the flake together to cup
by Electrolytic + then wax, in addition
we now have corrugated cups

No 2 = 1st run —

	Volt	to 50
9162	67	68
9117	133	171
9116	167	171
15	176	183
14	131	132
13	175	181
12	126	127
	2nd Run	
	160	163
	192	193
Equivalent to ~~475~~ for Req	195	198
	163	167
	195	197
	165	172

2nd

No 2 Cont'd put in KOH at — 545 pm — put in water at 7 pm [illegible] KOH at 830 am — Clipped after Wednesday 3 dips

Note: No 2 on this 2nd dipping has certainly swelled very much — disrupted the welded flake, this is bad but I think, that 3 dips are too much for the 2nd section & probably Solution absorbed not 6z so sappy — it also gants to Alcohol Solution as 6z at so it swell, dry growing — There is going to be trouble much trouble to avoid this swing — perhaps we must also weld Gallery, has the welding of No2 made it so high temp as we before — I found out was possible. As the pockets are swelled so my I bring them nearly to a boil in 21% + then put in water + then are able to get on Run after Blanching + drying + taking of weight & passing through

see page back

given to Louis to Run — all washed dried

Gauge recorded under Calipers

No 2 Chloride, same Conc Solas No1 — dipped slow air dried 1½ hours, redipped 1230 pm Mch 29 — allowed to stay in Solution 10 minutes, on dryer plate, 1245 pm — off dryer 210 pm — Dipped again at 218 pm — on dryer 225 pm —

off Dryer 408 — 410 pm put in 33% — took out of KOH at 510 pm put in water on heater

when put in KOH, from aqueous out more than No1 — it was not all over one or two spots on one 3. had none squeezed out, I think that the stuff in flake pocket is wet that 3 dips is OK — although it might possibly be better to not run. Not to go strong in solution, it acts poor for capillarity not running upwards — it all a pour 6z, it may trap hole air + 6z very unevenly filled —

Put it away for the night in glass water beside the heater both in Dryer 830 am — dipped at 1045 + put on Dryer

dipped at 215 + put on dryer, dipped at 435 pm

29th.

No 3 dipped - put on Dryer 5.55 pm 29th
2nd dip on dryer at 7.05 pm 29th =
put them away for the night at
715 - put them in water in morning
for 1½ hours, on Dryer 8.30 am 30th
dipped 9.55 am
Put in KOH. 11.55 am - rinsed off outside -
in water 2.10 pm
3 dips out of water, on drying
at 5.16 pm - looks yellow in the

2nd series - dipped at 1.55 pm on Dryer -
Dipped 1.20 - at 1.55 put in KOH.
9 dried them 5 mm on paper on plate
put in water at 2.15 notice that it
has swelled in Carbon.
Changed water 5.45
on Dryer 6.50 - in morning put on cobalt
them paper
9154 gain .627 9156 gain .702

3rd series -
Dipped 10.30 am
" 12.30 pm
in KOH. 2.25 pm -
Dry weight 9156 orig 1.937 now 1.3270
Total gain 1.333.

March 29, 05

Grids filled with .0002 cobalt.
plate treated with H_2 hydrogen.
2nd lot. 7 full neg. yellow heat.

9154 - 9160 incl.	2nd lot. full neg. yellow heat	
9154	11.800	dry. before dipping
9155	11.898	
9156	11.937	Dulphat Sulphate for Copper
9157	11.970	
9158	11.481	
9159	11.577	
9160	11.923	

1 (Carbon) Dipped at 6.05 pm - dried ~~not~~ on shelf for night - out, 4 left,
in KOH - 9.55 am dry - put in water -
dry - 9155 gained 1.522 - now dip.
at 2.55 - dried KOH now then
at 6 pm in water -
put away in water, change water
in morning

over

9D

No 4 dipped — put on Dryer 650 pm 29th —
put them away for the night at 7.25
put them on heater in morning
for 1 hour — on dryer 830 am 30th
Redipped 912 & put on heater
~~Not~~ Redipped 12 noon — Redipped 230 pm
~~Redipped~~
~~[illegible]~~
~~[illegible]~~
at 5.35 pm — in water against 7 pm
Changed bath at 5.30

2nd Series

Dipped 1130 am —
" 105 pm —
in KOH at 205 pm — in water
345 pm — Chged water 545
on Dryer 6.50 put in wing put on
asbestos then paper
~~No 9149 gms 9.99~~
9148 gms 9.19 sml g —
9145 " 1.117

3rd Series 7 dips

Dipped at 945 am —
" 11.75 pm
in KOH. 2.25 pm
washed ~~[illegible]~~ & dried.
on shelf for night. ~~[illegible]~~ 1.694
1.696

1st lot	about right decat	
# 9145	11.279	wt. before diffing
9146	12.094	
9147	11.735	Sul pinatyl Dyes Corp. Submitted
9148	12.105	
9149	11.733	
9150	11.420	
9151	11.800	

Sunday — Dipped 957 am — KOH at 1255 pm —
washed & Dryer at 3.45 —
put away for night Dried —
Dipped 8.20 am — wt Solution 835,
Dry 205 pm KOH at 215, had
in 3 hours then washed & dried all
night. No 9149 gms 1.677 —
all threes of No 4 are swelled —
no use going further — flake appeared
on both sides of film with in 30 m.

31 March 1905

Dry hydrated $MnCl_2$ dissolves pretty fast — Ethyl alcohol it sticks very hard on drying & no gummy — thus obtained work pure first — [illegible] & p.b.g. as result the alcohol being condensed & stored as it worked work more rapid

Can get — about 320 mil.g. per day —

Will see how soluble [illegible] chloride is —

March 31 1905
Bulb filled with cobalt 750 cc. g
heated H gas
3rd Set Bright heat (Low white)

# 905.7	11.820	gamma after Röntgenrad 385
9.142	11.745	
9143	11.752	gamma after Röntgenrad 493
9144	11.636	
9152	11.827	gamma 630.
9153		

Dips to be 1st

gain in weight $NiCl_2$, 1st 6 dips
only average 171 milgms
This shows that it proved
requires 15 series of 6 dips
each —
better make it 6 dips on 2nd
2nd —

Dipped 1158 am — 9 towards end of dipping
" 1215 — 9 put them right in film
" 1245 — 9 dips in all with 2 or 3 minutes
" 140 "
" 220
" 305 — 6 dips "

off the dies 350, well dried in KOH 353 pm —
in water at 455 pm —
on Dryer 650 — in morning put on dobs 8.00
then 9 pm —
Better if sample dehydrate.

3rd Series —

1st dip	820 am —	in KOH, 410 pm —
2 "	930	Dipped dehydrated film
3	11.10	Dipped time 615
4	1240	Set on shelf for night
5	2 pm	
6	3 pm	

The bottle marked 2 bottle alcohol
gives dust & much weight, gives trouble

No 5 — 9142 9087. 9143 9152 9144
$MiCl_2$ in ethyl alcohol —
1st dip at 350 pm with 31% Dipper
4 pm — 3 dipped 4 pm — 420 pm —
runs out in 1 to 2 minutes in 2 of them
probably heat too strong —
2 set up higher — dipped 4 pm 384 pm —
dipped 450, dipped 512 — 6 dips
gained 1.77 milgms
in KOH at 535 pm — Changed water at 8.30, dry by 930 —
~~Dip 2nd~~
~~2nd series of dips~~
~~10 Dipped water~~ —
4th Series
Sunday dipped 950 am — dipped 1040 am
Dipped 1115, put in KOH at 1230 pm —
on 17th dip after KOH + water 9142
gained 660 milgms —
39 only to dip —
notice buckling — from now on well
use methyl alcohol sol of $MiCl_2$ aq —
4 dips each —
5th Series —
Dipped methyl 410 — Dried put away
for night, in KOH then rinsed 810 am dry

in hot KOH 33 Show

No 5 in water 2.35 pm - Dried:
weighed 9143 gained 768 to-for
~~today~~ Dropped 940 - out of beyond 1005 a
on Dryer in KOH 33% hot 1.25 pm
only one drip about hours been 2
Water at 3.45 pm - out + drying at
6.55 pm - Dip in morning again
Hot on this morning 8.55
Dropped 10.45 a.m. - dry at -
Dropped again at, in KOH morning 9.20 am
in water 7.25 pm tomorrow
take out weighing dry -
on Drying 9.25 am ~~Dropped~~
Dropped 9 am -

grid No 9159 31 March 1905 - No 6

Try to shake 200 mesh dry $MnOH_2$
into sponge pocket,
Original wet pkt 11577 -
after screening on 200 11728
~~[illegible]~~
after some worked in
Muddy alcohol 12075
a gain 498 milgms -

We made a mush of 200 mesh
in alcohol put dried in
Vac + then let mush up
into Vacuum -
Weight after drying -
12078
No gain
We not move it up + down
many times in muddy $MnOH_2$
in alcohol -
after to weight 12485
a total in all operations
of 808 milgms -
did some Muddy again
Weight 12659
a gain total 1.082
0.082

[101]

March 31 1905 — No 6

200 mesh exponent Continued

Dipped it in new strong $MnCl_2$ in 95% good alcohol — dried on Asbestos in platin —

after drying weight 12.784

These exponents on 9159 =

in morning go ahead dipping Reg way

6 dips before KOH. - 7.55 ash dipped

making 2nd dip 825 3rd dips —

4th dip 945 — 5 dip 1115 - 6th dip 1220 pm

in KOH at 1258 pm - in water 140 pm

dried + weighed 325 pm

weight 13092

gain total 1.515 or .308 mily

for 6 dips in Alcoholic $MnCl_2$ agt

a 50 per dip —

2nd series 4 dips —

Dipped 325 pm

" 440 "

520

610 KOH at 635 pm —

Water at 650 - put on shelf for night.

Dipped 1111 —

in KOH, 240 pm -

Dried — gain so far 1.683.

Dipped 840 am

0.032

(103)

230 pm dipped the tins in
Chl N. ag Conc
445 put in warm 33 %

Try open end (e) one end peele with
felon – weld in Hydrogenous then
shake in 100 mesh stuff till full
then put in grid close end –
then finish by filling in Gal
by dipping process which
will serve also to lock the
100 mesh stuff in –
Can tell by the weight how full
it gets of 100 mesh.

May 17. 1905 - 513

Recorded in wrong place

It would seem that 33% swells very much more than in 21 & that this swelling probably affords space for plenty KOH, so that an charge can have plenty KH. The defect is that in flat pockets the swell continues & only a given ultimately get too much bulk — if it could be stopped swelling after the best results were attained it would be fine. Now I've an idea that we can do this with the tube pocket by loading it oval & then the action of the current & KOH will swell it to round & then it will come — by using the right oval the exact point of best swell can be attained.

Can load oval as the cases hold tubes in stamp mill & pocket can have their holes made oval & the tamping rod can be made of the same shape.

Possibly the right degree of pressure in tamping is important

New lot 10 pockets Cobalt flake about 790 milgms, tamped + welded at whitish yellow, a tamp higher than ever before - grid stuck together quite strong + glassy polish - Cut one + found flake OK =

9163 =	12 440
9164	12 148
9165	11 241
9166	11 345
9167	11 898

No 7

9168 11 402

9169 11 425

9170 11 583

9171 11 950

9172 11 616-

No 7

Methyl Alcohol. Merck Reagt – Saturated with $MnCl_2$ agt

First

Dipped 940 Sunday – 520 milg 1st dip before KOH. 2nd dip 1150 am. KOH at 1 pm – in water 110 pm – Dried – 9164 gained 422 milgms – or 210 milg per dip –

Second

Dipped 425 pm – dried & put away for night,
Dipped 827 am – out of Solution 840,
Dried 2 pm KOH 215 pm hot,
in water 6 o'clock, – out drying 810 – Thus using weighed 9167 – 12 710 – gains 812 milgms – 4 Dips – or 203 per dip –

Third

Dipped 915 on heat 928 – am –
Dipped 135 pm – 10 mm in Sol – on dryer
145 – at 345 put Crit. on plate it was on table from 145 to 345 pm –
KOH at 650 – out in using in H_2O 855 am

No 9164 gm 1.182 - Dipped 920 am
in Solution till 220 pm now on shelf
in KOH 925 am in water 9 am

No 8 -

Concent'd $NiCl_2$ agr -

First.

Dipped 946 am Sunday - put in KOH 1140 -
in water 12 noon - notice when put in water
separates a little - (next group dry with KOH in
gravity -) not long enough in KOH
for chloride should have 3/4 to
1 hour at 120 pm put it
back in KOH & go to dinner
out of KOH 240 & in water -
on drying 450 - dried put away for
night gained 475 mily 1st dip -

Second dip 8.17. am -- 12 noon dry
KOH at 1208 pm - hot, in water 6 pm -
on drying 820 pm 1 hr morning
No 9171 weighed 12620. a gain 670 ma
or 335 per dip - out begin'd dry 945 -
in KOH 130 - in water 345 on dry 757 pm
Dip in morning - put flat on 855
Dipped 10 45 am in KOH, next morning 9 20 am
in water 2 20 pm - (morning
take out H_2O & dry
on drying 925 am - CTR

Dropped again –

May 16 1909

Old 218 288 Cups Surface 864
Million Mills –
New Tube Cell 6 in 6 7/8 192 Tubes.
602 Million Sqr Mills –
or Tube cell has 70% of the Nickel
Surface of old Cell –
Tube cell has 1415 grms material in
tubes of which 990 is green Ni hydrox
Old cell has 737 grms material
of which 589 is green Ni Hydrox
or 60% of what is in Tube cell –
In tube cell as to depth from
the pocket it has 80% of its
active material in as good position
as in old C Cell,
Weight of Tube cell over old
Cell – .75 of a pound –

No 9 = dipped in Conc $MgCl_2$ aq
then right in 33% - 2 minutes in
33% then in water - 8 minutes
then while wet put in Conc $MgCl_2$
again for 5 minutes - then in
33% KOH, mixing - 4 min in 33%
then in water - 5 min in $MgCl_2$ aq
at 515 - at 520 in KOH, 33% -
in water 531 -

April 5 1905

N010 Conc $NiCl_2$

Corrugated pockets clinched at 4 corners. packed with .0002 Cobalt flake by plating. 780 milgms — welded in Hydrogen whitish yellow opened one found it welded OK -

9196 9183 9176 9175
12324.1[illegible]

9177

$NiCl_2$ aq

To be dipped twice in ~~Methyl~~ ~~Alcohol~~ solution of $NiCl_2$ - Dried 4" away from plate — gradually brought down to plate itself - Then KOH. 33% hot. Wash + dry -

First

Dipped 530 pm - on drying - it will not stand in 4 inches away. must be air dried until most Methyl off before going on heat, I set it up on shelf, all night on frame put flat at 855 am - in KOH 1040 am + in water 645 pm -

930 am Chng H_2O

on Dryer 220 pm –
Dip in morning – 2nd dip
Dripped 930 am – dripped in Conc HCl
by mistake – Dry 920 am

Methyl

No 11 — Methyl

To 6z dipped ~~once~~ in ~~Conc~~ $MnCl_2$
+ then KOH —

9189 - 9191 - 9178 - 9194 - 9179

First.

Dipped 550 PM - put on shelf - on frame
all night over plate - now flat 8 55 am
in KOH at 1040 am - in water 645 pm
920 am drip H_2O on dryer 220 pm
Dep in morning - dipped 910 am
in Methyl big mistake, hereafter Kodak
Drying 920

SB april 12 1905

Downstairs —

Experiments on plating or rather forming 1/4 inch tubes by plating from Ni. Sol. —

3 pm — Dribble $ClNi + NH_4$ Conc + peroxide hydrogen — Ni Rod bar in holes, 1st Zinc Coated, 600 milamp. 3' [illegible] — plated OK — closed the holes —

Another 8/56 (clockwise) 1/2 amp — Ng

(Wax rod [illegible] Copper) 517 pm — in $NiCl$ NH H_2O_2 good but long seed — Cu not thick enough —

Another 544 — Thicker Copper peel H_2O_2 in Sol. as before) before painting Cathode in — good but very peel but cut — Correct appearance under Tension by H_2O_2 in Cop.

Dr. Ludwig

April 13 1905

Have plated a 1/4 inch polished Nickel rod with Copper. Had all to redo by cutting the Copper to free it from material for will use these Cu tubes to plate nickel on & dissolve out Copper by O_2 + acid or NH_4 + H_2O_2

Have just found that rods of glass or pyrex grafted & plated which will be well on trying & heating the Copper shrinks but left the Copper come free possibly can plate the nickel on direct & get it off this way. Squirted chalk with a tender tube glass & plated & acid soon dissolves out chalk. Use portland cement & drills —

Apl 13 1905

Lamson & Co making a pat
moulds to work plastic
parts rods.
possibly a mixture of
1/3 or 1/2 of Celluloid & Cellulose
parts will act ok & the
blending [illegible] & thus
[illegible] pieces in
acids.

Am taking out Cop by
KCH Trial me & [illegible]
looks ok.

Today plating a little, [illegible]
putting in water & pulling
[illegible] dust crack
in McCutchy — especially
if prev placed Zinc or
Yellow Zn O2 in dust
by degrees roll and
Cement

Reduced Cop Cable in Hydrogen
contractors busted it — This problem
is Hell —

[H.F.]

April-15 - 1909

Have just made a lap tube thus which from experiment on tape, made well probably stand gas pressure of 30 atm. or pressed hard Hydrostatic tubes

(press.)

Tried to make a test cell with these lap tubes, we used Reg perfd stock & lap when dried and no perfns - Well use Reg Nux & Reg — 33% of it $ Cond. 33 well use 33% NaOH & stand. dest. 40% KOH & plasmolyze NaOH

gray to bind to Nylon

April 15 1905

Have at last succeeded — forming a tube of new mandril by placing from Double 72 Sulph Ammonium Sol hot 80 Cent, stirring then rolling to enlarge tube & pulling off — at last there is some hope — can't be made Cond S.S! — Density 1 amp per inch mandrel another 1/2 the density — When we have deposit under the great tension that Cos the stress burning it will be not only to find out the secret

It is essential to heat the deposit to get best results in rolling it to get it off mandril but if deposit is carefully done & Electrode clean it is ok anyway. The mandril should be hard. Am trying one of Kirchner & Stirbs

Electr cleaned on

Apl 15 1907 J.B.

a cathode in KOH with great current density

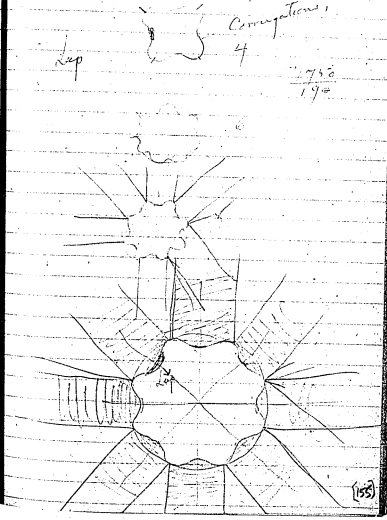
also going try Copper on positive this time

Now going try how high the can handle half of drop tubes in the before there was a melting then was can keep below this half & would the drop to the greatest extent possible —

It is probable that tube .003 X 250/1000 4½' long can be spun by 3 coupl at slight angle or lapping with or without of a mandrel

Regret I is going to try it

Apl 15 1905 518



April 15 1905 SB

Having trouble get more off by rolling it on the [illegible] — [illegible] [illegible] [illegible] stick —

Have placed a nickel [illegible] with copper & well plate [illegible] thus & well —
650 amp 1 hour 75@80 Cent. Doub Surf Fe Nil & — beautifully plated [illegible] & not brittle. Have to heat it —

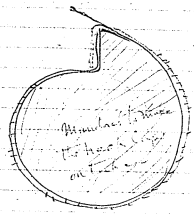
April 16 1905

Find that cleaning Mr rod in KOH burns Calf's dogs — the big for cleaning & clearing the deposit right —
The Nil electrode with [illegible] undulation made by

April 16 1905 SB

pressing wheel with teeth
on it or running it like
Cull scraps & fillers
with open rounds &
bushing & then cleaning
surface OK — blue Cold it
with Copper then plated
with Iron at 80 C holes
OK Etching and Copper
by Cuprit or Rotten
Chloride
Think this method Can be
made Comml —
The KOH Chloride or Tartrate
the Using brass anodes
Iron is first attacked
If Zinc is used it must
be polished after plating
Am trying Conc Double
Chloride 72 + NH4 at
80 C
Also Double Chl Na + NH4
80 C, ~~bar~~ 1/2 amp ov
2"

Apl 16. 1905 503



as this showed off mandible
digging into a [illegible] mandible
[illegible] above [illegible]
over & make the
hook

April - 16 1905

This is good - instead of the usual
Double Sulphate. [illegible]
hot 80 C. The plating is
infinitely better in fact
perfect in Cone Double
Chloride of Ni + NH4
80 C. I guess that [illegible]
heat for in Ni [illegible]
due to [illegible]
at the surface hence plating
in spots, whereas with
plating of Molecules a
heat to give great velocity
to some (not) [illegible]
Molecules only. Was not perfect
plating.
Chloride great density + [illegible]
but the sulphate -
No crackling -
Thank Double Chloride
Fe + Ni is good in now
[illegible]

Apl 17 1905

Spongal holes in mandrel
filled with Carbonite
dissolved in Pyridine —
Dried 300 — Cleaned
put in Kilt as Cathode to
1 Clean — in Copper solution
138 pm — 400 mil amp —
off 148 — in Ni Sol Chl Nickel
80 Cent in 150 pm —
550 mil amp — (550)
off at 4 o'clock put in water
Came out nearly (towards end
but major part OK — Holes
nearly all closed)

Can try one solid mandrel
No holes | Copped 20 minutes
400 mil amp — in Ni Cl Nickel
80 C sol 440 pm to be plated
2 hours at 500 mil amp —

Have tried Roll this in
morning

April 15 1907

We trying to bring an old test
so shell back to bring [illegible]
Soaking [illegible] first [illegible]
hot water then scraping on
soaking in Cane Cobb [illegible]
so critical then putting it
suddenly in self with [illegible]
Little [illegible] in [illegible]
heavy current [illegible]
to weld on the graphite —

Also going to change [illegible]
in which [illegible] [illegible]
the [illegible] [illegible]
[illegible] [illegible]
[illegible] [illegible]
well as good [illegible]
[illegible]
[illegible] [illegible]
[illegible] [illegible] bring [illegible]
Coach [illegible]

Apl 18 1907

From the [illegible] of [illegible]
[illegible] Colorado [illegible] 28 & 29
it would appear that nickel
alloyed with Cobalt is
worth dollars for keeping Cobalt
from being alloyed
Nickel ~~+ that~~ it can be
used for making flake

Have we very much [illegible]
[illegible]
[illegible]
[illegible] Co [illegible]
[illegible]

Bounty Co 27 well work
by this Cu 75 parts Ni 5 pts
also Co in place Ni –

May 2 1905

At last I have got a good process for making flake Co & Co Ni Comally

1st Experiment – Fuse Monosulphide of Potassium then add decitable Co Chlt after Co acetic decomposed add Sulphur heat till clear liquid Cool slowly Let the Sesquisulphide Co Crystallizes out Crystallizes in graphitic Lamina – & Resembles the Co Cl only it can be roasted to an oxide without loosing shape & then is reduced by Hydrogen OK –

Can determine proportions for best yield & also best for Co Ni alloy flake

[P.T.]

May 2 1905

used porcelain crucible -
Can use large Hessian
crucible in 20 or 30 ll
lots - everything else is done
out by weighing except
the fluke -

May 15 1905

SB
film.

Copper Nickel Mica

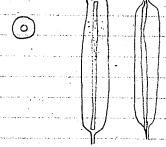
note
Cuprous Antimonate.
$3Cu_2O\ Sb_2O_3$ not attacked by any acid except long boiling HCl.

Nickel form
$(7CuO\ 5NiO)\ Sb_2O_3$?
all thin laminae 6 sided with
dont say how make it but it
by fracture & infer
probably formula $CuO.Sb_2O_3$ = Copper
longitudinal - Ending out Copper
by HNO_3 —

May 17 1905 -

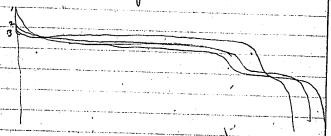
Warren is making flake 0001
of Cu Co. Cu Ni, Pd Cu Ag Cu
Ag Co Ag Ni, ~~Ag~~ Bi Cu Bi Ni
Bi Co Cd Co. Cd Ni & others
for test pieces in tubes —
plating process —

In tubes try an inner tube with some holes
in to afford a supply KOH or Chg & also
act as gas outlet to give gas pressure
Try one unconnected & connected
electrolytically — also non metallic
T about 1/16 -



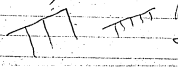
June 6th 1905 SB

It is curious that none run on hot ~~test~~ 130° Fahr with Reg Ni – (12)
4 Ni + 1 Iron after 44 runs
when run on Cold Coil
the Capacity ~~to~~ showed higher
+ every run showed higher
+ better V-charge.



+ known initial V-charge – Noticed that when Come off had ~~took~~ grade all white from Hg g/+ Bulb

Also noticed a bulky hair crystals deposits on charged now. so large that one would think it was Cross the Electrolyte Took Some out, showed crystal



June 6 1905 5B

It flowed in appeared to me just like Lead deposit. Gutch says has little Hg little Fe. Appears to be mostly lead although he is not placed Calcing - The amount in bulk on 1 run pocket varied to 1/2" Cubes - possibly the operating of the KOH up 18 hrs make allocating the Lead Solder + running back - possible Lead acts as a Catalytic agent to the mantle increase the Capacity - [illegible] from the mitchell [illegible] 7½ on 1 deep after 3rd run [illegible] shaped & worn Economical on chg. [illegible] that there is something that Commercial now or that hydrate are made anhy + [illegible] by heat in KOH. The fact that Calcing Ru may Fe in water makes it run better Capacity

BD

June 6 1905 SB

Either has to do with
dissolving out some deleterious
sub or the hydrated iron is
made semi or fully anhydrous
& irreducible to metal by
current — Am going to
make an elab cycle
test on iron after get
metal perfectly free for

Later gwa has analyzed
the deposit & finds it
62.5% Lead
16.6% Iron
20.9% Mercury —
it therefore comes
from the solder —

Swelled after 15 hrs 4/1000 in
Center, 11/1000 on Edges

0021

We have now put 6 nickel pocket with one row + changed the KOH for fresh KOH

Told Young man to save the old KOH + clean the pocket of the PbFe Hg deposit —

Miller's Samples. Ni Co. Parry Sound
dist 271 Cancrinite
Ni & Nickel in little Co
Good deal Copper —

375 Nickel very little Cop
Ni & Co Mly only tinted

377 = Big Copper Doubtful Ni Co

379 Cop Hg " " "

Mullan

364 – Copper. Doubtful Ni Co –

Previous ones done with Mill
Cast iron, also Cu
Thumbtacks Ni –

378 Mullan This has Cobalt
only no Copper or Ni –

367 Mullan Big Copper No Ni or Co

368 Mullan No Cop. No or Co

373 Mullan – Some Ni Thumb Cast Mill Copper

[198]

376 – Nickel – Little Copper –
Considerable nickel – Don't seem
to carry Co –

375 No Co –

353 – Considerable Cobalt,

354 – Big lots Cobalt,

358 No Cobalt ni or Cu

351 Big ~~Copp~~ Nickel pbly some Co –

349 Big Cobalt. pbly some nickel

362 Some Copper – a little
Nickel – possibly Little Co

370 – Nothing –

369 nothing – except possibly some
Cobalt –

374 nothing
Something strange about this
one with Nickel & Iron combined
some Other Element –

365 only Copper –

361 Little Copper –

360 Trace Cop ~~[illegible]~~
~~[illegible]~~

372 no appreciable [illegible]
Big Copper, No nickel
Hour finds Cobalt.

366 - Dirty Dunkerque.
only Copper appreciably

379 no nickel or Cobalt
Little Cop -

June 16 1905

It looks very much as if the green granules of $Ni(OH)_2$ when covered with fine like $NiCo$ or other floating powder on tubes & finally hard only make contact at points & when discharged the moment the point is discharged so it no longer is a conductor the balance of the granule still being charged & discharge but capacity is diminished. What is wanted after the tube is loaded & charged or reducing out if used then dried & and solution that will slightly dissolve the surface of the granule & before the solution can diffuse out to put in Rolf Coated + Dried this will make a layer connecting the granule better with the conducting film

June 16 1905 SB

Another way is to act on the surface left the granules by a solvent ~~of~~ the residue of which combines with the $Ni(OH)_2$, wash out solution & treat with KOH hot to decompose the salt of Ni + this will give a larger bulk of platiff-coated to the solid granules of film

288
800
2304

2

1 ft 10000 times for 80 lbs - .0002

12 inch cylinder - 2 ft long
is 6 ft.

6/10000
1666 - times -

20 cylinders / 1666 (83 times.
180
266

40 cylinders / 1666 (41 times —
1666

Say 40 cylinders 1 X 2

40 dips —

1st dip 10 sec 20 in 20 out 10 thro
Making 2 in 1 min —
Weight 1 min — Nickel 3 min
acid 5 min — wash 1 min
Say 15 minutes,
4 dips hour - or 80 dips —
Therefore 20 cylinders will do

2 men to gang - 18 cylinders
on one rod —

8 men Day 8 mp ft.
16 mn 160
16
96
16
80) 32 Cents Labor
32
32
2

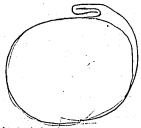
Think Can put double rod to
20 on plating header to
16 cents,
probably 4 Extra men to
Clean - gathered 240
5 1600
32

Say 25 Cents, 83 for metal
Total 115 Say 125
1/2 lbs 65 cents — for 18 —

40 lbs –

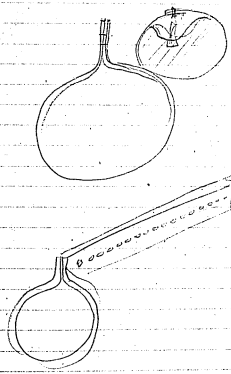
1000 –

35) 1440 (40



1 ft 10000 times,

3 ft



630
63
3 | 693
231
924

100 — 15
200 00750
400 00375

.015
1 013
2 .011
3 — 009
4 .0090
5 — .0070
6 — 06
5 — 05
5 — 04
6 — 035
7

200 min –
3

1200 mlq 100 –

5 dips

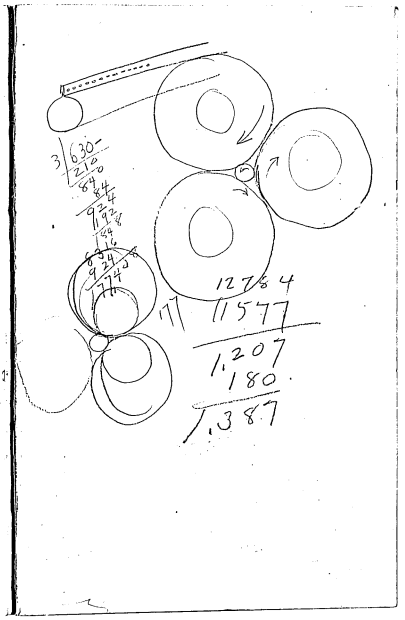
120 - cc 7 9 5 5

5 deps 300 min –
soak – 300
60
360

120 –

1 gms –

3 dags



[ITEM FOUND IN BOOK]

100 milgms -
200 "
600 "
1 gram
2 "
3 "
5 "
8 "
10 "